

**U. S. ARMY ROBERT MORRIS ACQUISITION CENTER
BROAD AGENCY ANNOUNCEMENT**

DAAD19-02-R-0004



ARMY RESEARCH PROGRAM IN DISPLAY TECHNOLOGY

MARCH 2002

**U. S. Army Robert Morris Acquisition Center
Research Triangle Park Contracting Division
4300 S. Miami Blvd.
Durham, NC 27703**

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I. INTRODUCTION

The U.S. Army Research Laboratory (ARL), Sensors and Electron Devices Directorate (SEDD), conducts research and development on technologies, which may provide new and improved capabilities for the war fighter. The internal research at ARL currently focuses on emissive technologies as well as collaborative work on nonemissive technologies with DOD contractors. ARL SEDD's extensive capabilities in electro-optics, materials fabrication, and the capabilities of the physical analysis group gives ARL the ability to address the physics of any display technology. Under this BAA, ARL SEDD is soliciting proposals for collaborative research and development of advanced information display technology with future application to Army Systems. It is expected that there will be collaboration between ARL and the awardees under this BAA through the shared use of facilities and expertise where appropriate. Set forth below is a list of facilities at the ARL Luminescent Materials and Devices Lab. This list is being provided for potential offerors to consider in the preparation of White Papers and proposals in connection with this BAA.

Facilities at ARL Luminescent Materials and Devices Lab	
Deposition: <ol style="list-style-type: none">1. Single system includes: (4) source PLD, (3) sputtering sources, with a heated stage to 600C. 2nd PLD only system.2. Deposition chamber with 8" sputtering sources for ITO and Al.3. Atomic layer deposition dielectric/phosphors.4. Thermal evaporator, multi sources (organics and inorganics), (3) sputtering sources (6) stage mask selection.5. Glove box, spin coaters for polymers, sol-gel films.6. Laminar flow hood – screen printing.7. High temperature furnaces, rapid thermal annealing, tube furnaces.8. OLED deposition system – multi source handle up to 4" glass.	<u>Characterization</u> <ol style="list-style-type: none">1. EL device characterization vs. temperature (5K-600K)2. DC and pulsed I-V characterization vs. temperature 5K-600K.3. Trap state spectroscopy, TSL, TSC, residual potential.4. Micro-Raman spectroscopy.5. FTIR spectrometer reflection/transmission.6. SPEX PL and phosphorimeter, vs. Temperature 8K-350K.7. Atomic force microscopy, near-field scanning optical microscopy.8. Vacuum UV PL spectrometer, (150nm to near-IR).9. Cathodoluminescence, static and pulsed. Low and high voltage.1. YAG laser with OPPO, for Time of flight carrier mobility, 280nm to 1µm. Equipped with an ICCD imaging and spectrometer.11. Fourier transform imaging system, angular light emission (Eldim)

Additional information on the Army and ARL can be found at their websites, <http://www.army.mil> and <http://www.arl.army.mil>.

II. RESEARCH PROGRAM

The Research Program will be funded under the 6.2 budget category. The research proposed is expected to comply with the appropriate funding definition as follows:

Applied Research: This activity translates promising basic research into solutions for broadly defined military needs, short of major development projects, with a view to developing and evaluating technical feasibility. This type of effort may vary from fairly fundamental applied research to sophisticated breadboard hardware, study, programming and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. It would thus include studies, investigations, and development effort. The dominant characteristic of this category of effort is that it is pointed toward specific military needs with a view toward developing and evaluating the feasibility and practicability of proposed solutions and determining their parameters.

Proposals addressing the following research areas will be considered. There may be significant overlap between the areas and a single proposal may address more than one area.

- 1. Materials:** Materials research is the enabling piece that allows the advancement of all displays technology. Proposals are sought that demonstrate improved performance in material efficiency, production (e.g. cost, substrate, temperature), ruggedness (e.g. flexibility, barriers, temperature range, lifetime), pixel count, and luminance range (e.g. very high to very low).
- 2. Head Mounted Displays (HMDs):** The Army and DOD have requirements for improved performance in HMDs for the dismounted soldier and in aviation/cockpit applications. Size, weight, and high resolution in full color are concerns for both applications. Cockpit applications have luminance concerns that range from sunlight legibility to night vision compatibility. A major soldier systems application concern is the power of the aggregate display to include all supporting electronics.
- 3. Direct View Displays:** Direct view applications cover a range of sizes from relatively small PDAs through mid-sized units in cockpits to the very large sizes required for simulators and command/control centers. In almost all cases there is an increasing need for greater pixel densities and in some cases greater pixel counts that are likely to exceed the 25-mega-pixel range. Luminance, efficiency, ruggedness and conformability are additional performance requirements that need to be improved or developed.
- 4. True Three-Dimensional (3-D) Displays:** For situational awareness, true 3-D displays may offer the Army and DOD new ways to more reliably disseminate and assess information. Innovative solutions to provide this capability are sought.

5. Novel display concepts: This topic includes new ideas in displays and in display performance as they relate to Army and DOD requirements. Two examples in this area are: A means to integrate intelligence into display pixels and thereby reduce demand on the limited bandwidth available for data transmission, and a means to reduce power demand through integrated intelligence and retained image capability.

III. GENERAL INFORMATION

Proposals are requested in the range of \$100,000 to \$1,000,000 per year with a one or two-year effort proposed. The second year effort will be optional on the part of the Government. Consequently, each year of effort proposed must have clearly defined goals and deliverables. Funding for proposed basic and optional efforts is contingent upon the availability of funds, performance level, and ARL's continued interest in the specific research area being addressed under the agreement. A minimum cost sharing of 20% of the program costs is required for each year of effort proposed. However, proposed recipients are encouraged to target cost sharing to 50% of the program costs. ARL intends to make these awards as cooperative agreements, as defined at 31 U.S.C. 6305, under the authority of 10 U.S.C. 2358. Information regarding the use of cooperative agreements may be found at the DoD Grant and Agreement Regulations at <http://www.dtic.mil/whs/directives/corres/html/32106r.htm>.

IV. CONDITIONS FOR ELIGIBILITY

To be eligible for award of a cooperative agreement, a prospective recipient must:

- **Be judged to have adequate financial and technical resources, given those that would be made available through the cooperative agreement, to execute the program of activities envisioned under the agreement.**
- **Have no known recent record of lack of responsibility or serious deficiency in executing such programs or activities.**
- **Have no known recent record indicating a lack of integrity or business ethics.**
- **Be otherwise qualified and eligible to receive a cooperative agreement under applicable laws and regulations.**

Proposals are encouraged from Historically Black Colleges and Universities (as determined by the Secretary of Education to meet requirements of 34 CFR Section 608.2) and from Minority Institutions, defined as institutions meeting criteria contained in 10 U.S.C. 2323(a)(1)(C) which reads: “minority institutions (as defined in section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)), which, for the purposes of this section, shall include Hispanic-serving institutions (as defined in section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).”

All work or research performed under any resulting awards from this Program Announcement must be performed within the United States.

Companies, business entities, or educational institutions that are directly or indirectly controlled by a foreign company or government may be eligible for participation under this BAA, if the foreign company, business entity or educational institution permits and encourages United States agencies, organizations, or persons to enter into research and development agreements and licensing arrangements on a comparable basis and has policies to protect the United States intellectual property rights. The foreign government under which the foreign entity operates must have adopted adequate measures to prevent the transfer of strategic technology to destinations prohibited under national security export control laws of the United States through appropriate international agreements to which the United States and such foreign government are signatories. Any proposal from a company, business entity, or educational institution that are directly or indirectly controlled by a foreign company or government must address how the individual entity will ensure compliance with the requirements of the International Traffic in Arms Regulation (22 CFR pt. 120 et seq.), the DoD Industrial Security Regulation (DoD 5220.22-R), and the Department of Commerce Export Administration Regulation (15 CFR pt. 730 et seq.)

It is recognized that non-U.S. citizens may perform under Cooperative Agreements awarded as a result of this BAA. Any recipient of such an agreement will be required to identify all non-U.S. citizens who will be performing under the cooperative agreement. Prospective recipients should keep in mind that access to ARL facilities by non-U.S. citizens may be difficult and may inhibit collaborative efforts at ARL. Non-U.S. citizens

will be required to submit a visit request to ARL and comply with the appropriate security requirements.

Federal laboratories, Federally Funded Research and Development Centers, and academic institutions that are federal government organizations (e.g., Naval Postgraduate School) may participate, but they may not receive funds awarded through this BAA.

V. POINTS OF CONTACT

Technical point of contact for this Broad Agency Announcement is Dr. David C. Morton, (301) 394-1916, email: dmorton@arl.army.mil. Questions regarding the administrative content of this Broad Agency Announcement may be addressed to Ms. Cara Castle at (919) 549-4311, email: cara@aro.arl.army.mil.

VI. WHITE PAPER SUBMISSION

An original and ten (10) copies of white papers are to be received at the following address by 3:00 PM local time on 4 APRIL 2002: (NOTE: Electronic submissions will NOT be accepted under this BAA.)

**U.S. ARMY ROBERT MORRIS ACQUISITION CENTER
RTP DIVISION
ATTN: CARA CASTLE/BAA DAAD19-02-R-0004
4300 S. MIAMI BLVD.
DURHAM, NC 27703
Telephone No.: (919)549-4311**

Any White Paper received at the Government office designated above after the exact time specified for receipt of White Papers in this BAA is "late" and will not be considered for evaluation unless the Grants Officer determines that accepting the late White Paper would not unduly delay the acquisition; and (1) there is acceptable evidence to establish that it was received at the Government installation designated for receipt of White Papers and was under the Government's control prior to the time set for receipt of White Papers; or (2) it is the only acceptable White Paper received. Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the White Paper wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel. If an emergency or unanticipated event interrupts normal Government processes so that White Papers cannot be received at the office designated for receipt of White Papers by the exact time specified in this BAA, and urgent Government requirements preclude amendment of the BAA, the time specified for receipt of White Papers will be deemed to be extended to the same time of day specified in the BAA on the first work day on which normal Government processes resume.

An email acknowledging the receipt of the White Paper will be sent to the POC identified in the White Paper within 2 days of receipt of the White Paper.

White Papers are limited to 6 pages and shall include the following:

Page 1. A summary of the white paper (abstract of proposed work, areas of BAA addressed, budget summary with cost share, performing organization and POC information for the white paper to include name, address, telephone number, facsimile number and email address.)

Pages 2-4. A maximum of 3 pages describing the proposed research and collaboration, relevance to the Army and ARL, how proposed effort compares to other work in field, expected results, etc.

Page 5. Qualifications of principle investigators and performing organization, and facilities and equipment that will be made available for this effort.

Page 6. A one-page budget estimate including labor, equipment, facilities, overhead, cost share, etc. (NOTE: A minimum cost sharing of 20% of the program costs is required for each year of effort proposed. However, proposed recipients are encouraged to target cost sharing to 50% of the program costs.)

Each White Paper must be typed and no longer than 6 pages as stipulated above. Pages in excess of this page limitation will not be considered in the evaluation of the White Paper. A page is defined as 8 ½ x 11 inch paper, single-spaced, single-sided, with one-inch margins and a typeface of 12-pitch. All pages should be numbered consecutively.

White Papers will be evaluated using the criteria set forth in Section VIII.

The POC identified in the White Paper will receive an email notification to either encourage or discourage submission of a complete proposal on or about 19 April 2002. The email will also provide the required date and time for the submission of the complete proposal.

VII. PROPOSAL SUBMISSION

Proposals must be received by the date and time specified in the email encouraging the submission of a complete proposal. (NOTE: Electronic submissions will NOT be accepted under this BAA.)

**U.S. ARMY ROBERT MORRIS ACQUISITION CENTER
RTP DIVISION
ATTN: CARA CASTLE/BAA DAAD19-02-R-0004
4300 S. MIAMI BLVD.
DURHAM, NC 27703
Telephone No.: (919)549-4311**

Any Proposal received at the Government office designated above after the exact time specified for receipt of Proposals in this BAA is "late" and will not be considered for evaluation unless the Grants Officer determines that accepting the late Proposal would not unduly delay the acquisition; and (1) there is acceptable evidence to establish that it was received at the Government installation designated for receipt of Proposals and was under the Government's control prior to the time set for receipt of Proposals; or (2) it is the only acceptable Proposal received. Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the Proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel. If an emergency or unanticipated event interrupts normal Government processes so that Proposals cannot be received at the office designated for receipt of Proposals by the exact time specified in this BAA, and urgent Government requirements preclude amendment of the BAA, the time specified for receipt of Proposals will be deemed to be extended to the same time of day specified in the BAA on the first work day on which normal Government processes resume.

One (1) signed original and ten (10) copies are required. Each proposal must be typed and not longer than 20 pages (not including the cover page, 1 page abstract and budget.) Pages in excess of this page limitation will not be considered in the evaluation of the proposal. A page is defined as 8 ½ x 11 inch paper, single-spaced, single-sided, with one-inch margins and a typeface of 12-pitch. All pages should be numbered consecutively, beginning with the first page after the proposal cover page and abstract.

Specifically, proposals shall include the following:

- (1) Cover page: Each proposal shall use Attachment 1 to this BAA as the cover page for the proposal.**
- (2) Abstract: The offeror must provide an abstract no longer than one page.**
- (3) Text: The technical portion of the proposal should be typed, single-spaced. This section of the proposal is limited to 20 pages and shall:**

- (a) Describe in detail the research to be undertaken. State the objectives and approach and the relationship to the state-of-knowledge in the field and to similar work in progress. Include appropriate literature citations. Discuss the nature of expected results.**
 - (b) Describe in detail proposed relevant collaborations (planned or in place) with ARL, industry, other government organizations, or other appropriate institutions. Particularly describe how collaborations are expected to facilitate the transition of research results to application. Describe plans for the research training of students in science and/or engineering.**
 - (c) Describe the qualifications of the principal investigator and other key researchers involved in the project. Include curriculum vitae. For all proposals, one individual should be the designated principal investigator for purposes of technical responsibility and contact.**
 - (d) Describe the facilities available for accomplishment of research objective. Describe the equipment planned for acquisition under this program and its application to objective. When possible, equipment should be purchased very early in the research award period.**
 - (e) Identify other parties to whom the proposal has been or will be sent.**
- (4) Cost: The financial portion of the proposal should contain cost estimates sufficiently detailed for meaningful evaluation, including explanation pages as appropriate. Use Attachment 2, ARO Form 99, Summary Proposal Budget to submit budget data for each year proposed, and a summary page for the total proposed. For budget purposes, use an award start date of July 1, 2002. A minimum cost sharing of 20% of the program costs is required for each year of effort proposed. However, proposed recipients are encouraged to target cost sharing to 50% of the program costs.**

Proposals will be evaluated using the criteria set forth in Section VIII.

The Business POC identified in the Cover Page for the Proposal will receive an email indicating whether or not the proposal has been selected on or about 31 May 2002.

Awards are anticipated to be made in July 2002.

VIII. EVALUATION CRITERIA

Evaluation and selection will be based on the following criteria:

- 1. The overall scientific and technical merits of the proposal.**
- 2. The potential contributions of the proposed research and collaboration to the Army and the ARL mission.**
- 3. The qualifications, capabilities and experience of the principal investigator and other key research personnel; and the experience, capabilities and qualifications of the institution sponsoring the proposal.**
- 4. The facilities and equipment that will be made available for the proposed effort and how those resources will enhance the proposed research effort.**
- 5. The extent to which the cost sharing proposed enhances the proposed research program.**
- 6. The realism and reasonableness of cost.**

ATTACHMENT 1
PROPOSAL COVER SHEET
(to be completed and submitted with proposal)

**PROPOSAL SUBMITTED TO THE U. S. ARMY RESEARCH LABORATORY FOR
ARMY RESEARCH PROGRAM IN DISPLAY TECHNOLOGY**

PROPOSAL AMOUNT:

PROPOSED DURATION:

NAME AND ADDRESS OF ORGANIZATION:

TECHNICAL POC FOR ORGANIZATION:

PHONE, FAX AND EMAIL FOR TECHNICAL POC:

BUSINESS POC FOR ORGANIZATION:

PHONE, FAX AND EMAIL FOR BUSINESS POC:

PROPOSAL VALID UNTIL (min. of 6 months)

TAXPAYER IDENTIFICATION NUMBER (TIN):

DATA UNIVERSAL NUMBERING SYSTEM (DUNS No.):

COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE:

**LISTING OF THE NAMES OF ALL ORGANIZATIONS INCLUDED IN THE
PROPOSAL (i.e. the recipient and all sub-recipients and subcontractors).**

**IDENTIFICATION OF RESOURCE CONTRIBUTIONS (COST SHARING) PROPOSED
INCLUDING THE PROPOSED AMOUNT (VALUE) OF THE CONTRIBUTION; AND
THE NATURE OF THE CONTRIBUTION (e.g. cash, labor, equipment, facilities, etc.):**

**SIGNATURE OF PERSON AUTHORIZED TO SUBMIT THE PROPOSAL AND BIND
THE ORGANIZATION:**

TYPED NAME AND TITLE OF PERSON SIGNING THE PROPOSAL:

DATE THE PROPOSAL IS SIGNED:

ATTACHMENT 2
SUMMARY PROPOSAL BUDGET
YEAR-

OFFEROR						
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR (PI/PD)						
A. SENIOR PERSONNEL, PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in parentheses)	Man Hrs/Mo	Rates	-Mos			Funds Requested by
			CAL	ACA	SM	Offeror
1.						
2.						
3.						
4.						
5.						
6. () OTHERS (LIST INDIVIDUALLY ON BUDGET EXPLANATION) PAGE						
7. () TOTAL SENIOR PERSONNEL (1-6)						
B. OTHER PERSONNEL (SHOW NUMBERS IN PARENTHESES)						
1. () POST DOCTORAL ASSOCIATES						
2. () OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)						
3. () GRADUATE STUDENTS						
4. () UNDERGRADUATE STUDENTS						
5. () SECRETARIAL - CLERICAL (If charged directly)						
6. () OTHER						
7. TOTAL SALARIES AND WAGES (A + B)						
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)						
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)						
D. PERMANENT EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.00. ATTACH ADDITIONAL EXPLANATION PAGES, IF NECESSARY.)						
TOTAL PERMANENT EQUIPMENT						
E. TRAVEL (LIST ON BUDGET EXPLANATION PAGE)						
1. DOMESTIC (INCLUDE CANADA, MEXICO, AND U.S. POSSESSIONS)						
2. FOREIGN						
F. PARTICIPANT SUPPORT COSTS						
1. STIPENDS \$						
2. TRAVEL						
3. SUBSISTENCE						
4. OTHER						
() TOTAL PARTICIPANT COSTS						
G. OTHER DIRECT COSTS (ITEMIZE ON BUDGET EXPLANATION PAGE)						
1. MATERIALS AND SUPPLIES						
2. PUBLICATIONS COSTS/DOCUMENTATION/DISSEMINATION						
3. CONSULTANT SERVICES						
4. COMPUTER (ADPE) SERVICES						
5 SUBAWARDS						
6. OTHER						
7. TOTAL OTHER DIRECT COSTS						
H. TOTAL DIRECT COSTS (A THROUGH G)						
I. INDIRECT COSTS		Rate	Base	Total		
	Overhead					
	G&A					
	Fringe					
TOTAL INDIRECT COSTS	FCCM					
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)						
K. FEE (%) BASE \$						
L. COST SHARING						
M. AMOUNT OF THIS REQUEST						
PI/PD NAME (TYPED) & SIGNATURE					DATE	
OFFEROR'S AUTHORIZED REP. NAME (TYPED) & SIGNATURE					DATE	

